

2. On the Germ Theory of Putrefaction and other Fermentative Changes. By Professor Lister.

The following Gentlemen were elected Fellows of the Society :—

JOHN G. M'KENDRICK, M.D., Assistant to the Professor of Physiology in the University of Edinburgh.

ROBERT WILSON, Esq., Engineer, Patricroft, Manchester.

Monday, 21st April 1873.

PROFESSOR KELLAND in the Chair.

The following Communications were read:—

1. Notice of New Fishes from West Africa :—

(I.) *Ophiocephalus obscurus*, Günther.

(II.) *Synodontis Robbianus*, nov. spec. mihi.

By John Alexander Smith, M.D.

The fishes now exhibited were brought by the Rev. Alexander Robb, D.D., from Old Calabar, West Africa. They were taken in the fresh water of the great Old Calabar River, near Ikorofiong, about a hundred miles or so, by the windings of the river, from the bar near its mouth. The Rev. Dr Robb resides at Ikorofiong, which is one of the stations of the Calabar mission of the United Presbyterian Church.

The fishes belong to the great SUB-CLASS of the TELEOSTEI.

I. *Ophiocephalus obscurus*, Günther.

The first to which I would call attention is a small dark-coloured fish; it belongs to the Order of the ACANTHOPTERYGII, Family OPHIOCEPHALIDÆ, and to the Genus *Ophiocephalus*.

Dr Günther, in his "Catalogue of Acanthopterygian Fishes," vol. iii. p. 468, states that the fishes of this family have the *body elongate, anteriorly sub-cylindrical*, and covered with scales of moderate size; the head depressed and snake-like, covered with shield-like scales superiorly. *A cavity accessory to the gill cavity, for the purpose of retaining water in it*, a superbranchial organ, not

being developed. *One long dorsal and anal fin without spines.* "They are fresh-water fishes of the East Indies, and are able to live and move without the water for a short time, feeding on small animals." "It appears, from recent observations, that the amount of air which is in solution in water is not sufficient for the respiration of these fishes, so that they are obliged to come to the surface at certain intervals, to receive an additional quantity of atmospheric air."

The genus *Ophiocephalus* is distinguished by the presence of ventral fins. The species of this genus are common in India and the East; some of them, as the "*Cora mota*" or "*Gachua*" (the *O. gachua*) of Bengal, have excited considerable interest from making their appearance during the rains in unexpected places, and giving rise to the popular belief that they must have fallen with the rain from the clouds; the fish having left, for the time, the muddy waters where it resides, for the fresh wet grass, and the abundance of animal food it gets there.

This genus was believed to be entirely confined to India and the East until Dr Günther, in the year 1869, detected in the collection of fish made by Consul Petherick on the Nile one species which he has described as the *O. obscurus*. It was captured at Gondokoro on the Upper Nile, and forms the only exception yet known to the Indian habitat of the genus.

The interesting fact of the great apparent correspondence of the fish fauna of the Nile with the distant rivers of West Africa was pointed out many years ago; the fauna of the East African rivers being apparently somewhat different in character. Dr Günther, from a careful examination of a number of species from the Nile and West African rivers, comes to the conclusion that—"the Faunæ of the Nile and the West African rivers belong to the same zoological district; that there is an uninterrupted continuity of the fish fauna from west to east; and that the species known to be common to both extremities inhabit also the great reservoirs of water in the centre of the African continent."*

It is, therefore, with some little interest that I am able to add this single species of *Ophiocephalus* found in the Upper Nile, to the

* See Petherick's "Travels in Central Africa," vol. ii. London, 1869. Appendix, "Fishes of the Nile," by Dr A. Günther.

list of corresponding species found in the great Calabar river of Western Africa. The specimen seems to correspond very closely with Dr Günther's typical description of the *O. obscurus*, with the exception of some slight proportional details of measurements and the presence of one or two more rays in some of the fins. I forwarded the fish to Dr Günther for his examination, and he writes me that "the *Ophiocephalus* is closely allied to, if not identical with, the *obscurus*, but it has five or six more dorsal rays than the type." We must, therefore, perhaps, wait for the examination of additional specimens, to see whether some of the characters will require to be expanded a little, in Dr Günther's description of the fish.

(Since this paper was read to the Society, Dr Günther informs me that the British Museum has recently received a specimen from the river Congo, with thirty anal rays.)

I subjoin Dr Günther's description of the Nile fish, taken from the appendix to Petherick's "Travels in Central Africa," vol. ii. London, 1869, p. 215. Dr Günther had, however, previously described and named this fish in his general "Catalogue of Acanthopterygian Fishes," vol. iii., London, 1861, p. 478, from a specimen in the collection of the British Museum, the locality of which was not known:—

"*Ophiocephalus obscurus*, A. Günther.

D. 42. A. 26-29. (L. lat. 70. L. trans. 7/14.)

"The height of the body is nearly one-eighth of the total length, the length of the head nearly one-fourth; the width of the inter-orbital space is more than the extent of the snout, and one-fourth of the length of the head. The cleft of the mouth is wide, the maxillary extending behind the orbit. The scales on the upper surface of the head are of moderate size, those on the neck small; there are thirteen series of scales between the orbit and the angle of the preoperculum. The pectoral does not extend on to the origin of the anal, and its length is one-half that of the head; the length of the ventral is three quarters of that of the pectoral. Caudal rounded, its length being six times and one-third in the total. Blackish, lighter below, with dark stripes along the series of scales; a series of black blotches along the side; head with two indistinct oblique black spots along its base. Pectoral and ventral variegated with blackish. Chin black, with white spots. Length seventy-seven lines. Collected at Gondokoro."

The following are some of the slight differences in the specimen got in the Old Calabar River:—

Ophiocephalus obscurus, A. Günther.

D. 45. A. 32. P. 16. V. 6. (L. lat. about 70. L. trans. 7/14.)

Height of body, $7\frac{1}{2}$ times in total length of fish. Length of head, $4\frac{1}{2}$ times in total. The length of the pectoral fin is a little more ($\frac{1}{8}$ of an inch), than half the length of head. Length of ventrals rather more than half that of pectorals. Caudal fin is $5\frac{1}{4}$ times in the total length. Head and body above are black, or a very dark brown (in spirits), the sides show numerous black blotches; fins black, tail slightly mottled with lighter. Below, head black, blotched with lighter, rest of body dirty white. Total length, 78 lines ($6\frac{1}{2}$ inches.)

Collected at Ikorofiong, Old Calabar River, West Africa.

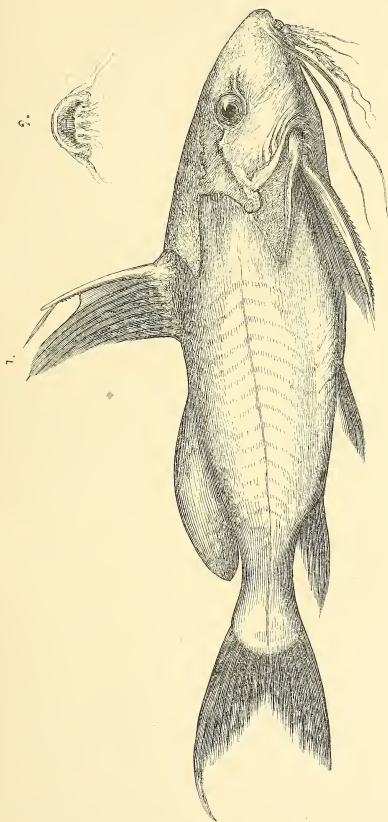
II. *Synodontis Robbianus*, nov. spec. mihi.

The other fish belongs to the Order of the *PHYSOSTOMI*, Family *SILURIDÆ*, and to the Genus *Synodontis*. All the species of this genus belong to tropical Africa, and at least one species has been discovered common to the Upper Nile and the West African rivers. They are scaleless fish, with an adipose fin, and the dorsal and pectoral fins have strong bony spines. Mouth small, Teeth in the lower jaw movable, very thin at the base, and with slightly dilated brown pointed apices. They have six barbels, and broad dermal bones on the head and neck. I have taken these details of the characters of the genus from Dr Günther's important work, the "Catalogue of Fishes," vol. v., to give a general idea of the fish, and the following are the character of this new species:—

Synodontis Robbianus.

Body.—Height (behind dorsal fin), about one-fourth of length without caudal rays. Greatest height; one-third of distance between posterior border of orbit, and caudal extremity without fin rays. *Head* about three and a half times in length of body, without caudal fin; tapers quickly forwards; short in front of eyes; distance from point of snout to front of orbit, about one-third of length from snout, to posterior extremity of nuchal plate. Snout short, rounded in front; distance between middle of orbits rather less than to front of snout. The gill openings extend downwards to before the root of humeral process of pectoral fin.

Teeth:—*Mandibular*, rather numerous, much shorter than the eye (about half), varying in length, the longest towards the middle; in a cluster on



1. *Synodontis Robbianus* (natural size).

2. Mouth, showing teeth and roots of barbels.

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the middle of front of lower jaw. *Maxillary* teeth in front of upper jaw, small, short, thickly set in a broad band.

Barbels:—*Maxillary barbels*, dark-coloured, much longer than head, reaching more than half way down pectoral spines; edged with a broadish membrane interiorly. *Mandibular barbels*.—*Outer*, dark-coloured, slightly fimbriated or fringed, reaching to base of pectoral fin. *Inner*, light-coloured, about half the length of outer, and more distinctly fringed.

Dermal bones of head and neck.—Broad, rough or granular; terminate in front of eyes in forked processes; broad behind, and extend in a pointed process a little beyond each side of base of dorsal spine. *Humeral process*.—Much longer than high, pointed behind, runs nearly as far back as nuchal plate, granular surface, a slight projecting ridge along anterior margin, and a thick, somewhat smooth, and tapering ridge projects along its inferior border.

Fins rather small:—D. 1/8. A. 12. P. 1/7. (V. 7.)

Dorsal fin.—Spine shorter than the head (fixed upright), almost smooth in front, showing only some very obscure indications of a few short processes or teeth at upper part; toothed at upper part behind, teeth directed somewhat towards base of spine; (a small soft ray or filament inserted a little below the point.) First five rays (the third the longest) as long as spine and filament together. *Adipose fin*.—Elevated; longer than head; space between it and dorsal, about equal to length of base of dorsal fin without spine. *Pectoral fin*.—Spine larger and longer than dorsal, toothed on both sides; teeth small and thickly set together on outside, directed towards extremity of spine; teeth larger and more apart on inner side, and point towards base of spine; fin reaches a little beyond base of dorsal fin, but not to base of ventral fins. *Ventral fins*.—Small; in length pass anal opening, but do not reach to base of anal fin. *Anal fin*.—Larger than ventral.

Tail.—Forked nearly half the depth of rays; two uppermost rays produced about a third beyond others.

Colour (in spirits).—Pale brown, slightly blotched or mottled with darker, especially on head, at insertions of fins and tail, and on rays of fins and tail. Ventrals and anal fin nearly black. Spines light coloured.

Total length of fish without caudal rays, $4\frac{3}{8}$ inches; to extremity of elongated caudal rays, $5\frac{3}{8}$ inches. From point of snout to posterior extremity of nuchal plate ($1\frac{7}{8}$ inches), fully a third of total length to extremity of elongated caudal rays. Total length of specimen, $5\frac{5}{8}$ inches.

Captured at Ikorofiong, Old Calabar River, West Coast of Africa.

I have named the fish after the Rev. Alexander Robb, D.D., to whom I am indebted for these specimens, as well as various others, from the Old Calabar district of tropical Africa.

Dr Robb tells me there are great difficulties in the way of getting

specimens of natural history of almost any kind in Old Calabar; and one in particular depends on the fact, that the natives eat at once all they can capture, and are most unwilling to give them up for any other than their own gastronomic purposes.

The fishes of this genus *Synodontis*, and the allied genera, are interesting to the geologist from their possessing dermal bony plates, and also these strong bony fin-spines, which are analogous in character to some of those in the fossil fishes, and to the *ichthyodorulites*, or fin spines, which are found fossil in many of our older rocks.

These bony spines are useful to the fish as weapons both of offence and defence, and require a very careful handling of some of the species, which grow to a considerable size, as they sometimes inflict serious wounds, which are said to be poisonous, even in some cases causing death. Dr Robb says, the dangerous character of the fish of this genus is well known to the Old Calabar natives, as well as, doubtless, to some of the animals which prey upon fish. Crocodiles are abundant in the river, and in some instances make a seizure of one of these fishes with the large bony spines, and cases have occurred of a crocodile being found dead with the spiny fish sticking in its mouth or throat. This circumstance has probably given rise to an Efik proverb well known among the people, to this effect,—“When the Crocodile is lucky, he catches *Inanga*” (the spineless cat fish); “when unlucky, he catches *Mkpi-kuk-i-kuk*” (the native name for this spiny fish or *synodontis*), the etymology of which, Dr Robb tells me, is not very obvious. The proverb, indeed, wonderfully resembles our own common saying about “catching a Tartar,” and is frequently used by them in its more general application, as among ourselves.

2. The Electrical Conductivity of certain Saline Solutions, with a note on their Density. By J. A. Ewing and J. G. MacGregor, B.A. Communicated by Professor Tait.

(Abstract).

In the note on the density of the solutions prepared for the purpose of determining their electrical conductivity, it is shown that the ratio of the weight of salt dissolved in unit weight of water to the